CLAIMS

What is claimed is:

1. A method of adhering two or more surfaces, the method comprising:

i.) providing a first surface comprising a plurality of nanofibers attached thereto;

ii.) providing at least a second surface; and,

iii.) contacting the first surface and the at least second surface.

2. The method of claim 1, wherein one or more of the first surface, the at least second surface, and the plurality of nanofibers, comprise a material selected from the group consisting of: silicon, glass, quartz, plastic, metal, polymers, TiO, ZnO, ZnS, ZnSe, ZnTe, CdS, CdSe, CdTe, HgS, HgSe, HgTe, MgS, MgSe, MgTe, CaS, CaSe, CaTe, SrS, SrSe, SrTe, BaS, BaSe, BaTe, GaN, GaP, GaAs, GaSb, InN, InP, InAs, InSb, PbS, PbSe, PbTe, AlS, AlP, AlSb, SiO_1, SiO_2, silicon carbide, silicon nitride, polyacrylonitrile (PAN), polyetherketone, polyimide, an aromatic polymer, and an aliphatic polymer.

3. The method of claim 1, wherein contacting the first surface and the at least second surface comprises creation of van der Waals attraction between the surfaces.

4. The method of claim 3, wherein the attraction comprises from at least about 0.1 newton per centimeter^2 to at least about 100 newtons per centimeter^2.

5. The method of claim 3, wherein the attraction comprises from at least about 0.5 newton per centimeter^2 to at least about 50 newtons per centimeter^2.

6. The method of claim 3, wherein the attraction comprises from at least about 1 newton per centimeter^2 to at least about 25 newtons per centimeter^2.

7. The method of claim 3, wherein the attraction comprises from at least about 2 newtons per centimeter^2 to at least about 10 newtons per centimeter^2.

8. The method of claim 1, wherein contacting the first surface and the at least second surface creates adherence between the surfaces through creation of friction forces between the surfaces, which friction forces are greater than a friction force between the first surface and the at least second surface in the absence of the plurality of nanofibers..

9. The method of claim 1, wherein the first surface comprises a surface density of members of the plurality of nanofibers, which surface density comprises from at least about 1 nanofiber per micron^2 to 1000 or more nanofibers per micron^2.

10. The method of claim 1, wherein the first surface comprises a surface density of members of the plurality of nanofibers, which surface density comprises from at least about 5 nanofibers per micron^2 to 500 or more nanofibers per micron^2.

11. The method of claim 1, wherein the first surface comprises a surface density of members of the plurality of nanofibers, which surface density comprises from at least about 10 nanofibers per micron^2 to 250 or more nanofibers per micron^2.

12. The method of claim 1, wherein the first surface comprises a surface density of members of the plurality of nanofibers, which surface density comprises from at least about 50 nanofibers per micron^2 to 100 or more nanofibers per micron^2.

13. The method of claim 1, wherein the first surface and the at least second surface comprise a same material.

14. The method of claim 1, wherein the nanofibers comprise hollow nanotubular structures.

15. The method of claim 1, wherein substantially all nanofibers comprise one or more associated moiety.

16. The method of claim 15, wherein substantially all nanofibers comprise a coating of the one or more associated moiety.

17. The method of claim 15, wherein the one or more moiety comprises a functional moiety.

18. The method of claim 17, wherein the functional moiety increases a van der Waals attraction between the nanofiber and the at least second surface, which increased attraction is greater than a van der Waals attraction between the nanofiber and the at least second surface in the absence of the moiety.

19. The method of claim 17, wherein the functional moiety increases friction forces between the nanofiber and the at least second surface, which increased friction forces are greater than a friction force between the nanofiber and the at least second surface in the absence of the moiety.

20. The method of claim 17, wherein the functional moiety comprises a covalent bond between the nanofiber and the at least second surface.

21. The method of claim 1, wherein the at least second surface comprises a plurality of nanofibers attached thereto.

22. The method of claim 1, wherein substantially each member of the plurality of nanofibers passes more than once, through a selected plane above the first substrate.

23. A method of joining two or more articles, the method comprising:

i) providing a first article having at least a first surface, wherein the first surface comprises a plurality of nanofibers attached thereto,

ii) providing at least a second article having at least a first surface;

iii) mating the first surface of the second article with the plurality of nanofibers on the first surface of the first article, whereby the nanofibers contact the first surface of the second article at a plurality of contact points, such that forces between the nanofibers and the first surface of the second article adhere the first article to the second article.

24. The method of claim 23, wherein the forces between the nanofibers and the first surface of the second article comprise van der Waals forces.

25. The method of claim 23, wherein the forces between the nanofibers and the first surface of the second article comprise friction forces.

26. The method of claim 23, wherein the plurality of contact points comprises a density of contact points per unit area of the second surface.

27. The method of claim 26, wherein the density of contact points comprises from at least about 1 nanofiber per micron^2 to 2000 or more nanofibers per micron^2.

28. The method of claim 26, wherein the density of contact points comprises from at least about 5 nanofiber per micron^2 to 1000 or more nanofibers per micron^2.

29. The method of claim 26, wherein the density of contact points comprises from at least about 10 nanofiber per micron^2 to 500 or more nanofibers per micron^2.

30. The method of claim 26, wherein the density of contact points comprises from at least about 50 nanofiber per micron^2 to 250 or more nanofibers per micron^2.

31. The method of claim 26, wherein the density of contact points comprises from at least about 75 nanofiber per micron^2 to 150 or more nanofibers per micron^2.

32. The method of claim 23, wherein the plurality of contact points comprises a percent contact area of the second surface.

33. The method of claim 32, wherein the percent contact area comprises from about 0.1% to at least about 50% or more.

34. The method of claim 32, wherein the percent contact area comprises from about 0.5% to at least about 40% or more.

35. The method of claim 32, wherein the percent contact area comprises from about 1% to at least about 30% or more.

36. The method of claim 32, wherein the percent contact area comprises from about 2% to at least about 20% or more.

37. The method of claim 32, wherein the percent contact area comprises from about 5% to at least about 10% or more.

38. The method of claim 23, wherein the plurality of contact points comprises a density of contact points per unit area of the second surface and wherein the plurality of contact points comprises a percent contact area of the second surface.

39. The method of claim 38, wherein the density of contact points comprises from at least about 1 nanofiber per micron^2 to about 2000 or more nanofibers per micron^2, from at least about 5 nanofiber per micron^2 to about 1000 or more nanofibers per micron^2, from at least about 10 nanofiber per micron^2 to about 500 or more nanofibers per micron^2, from at least about 50 nanofiber per micron^2 to about 250 or more nanofibers per micron^2, or from at least about 75 nanofiber per micron^2 to about 150 or more nanofibers per micron^2; and, the plurality of contact points comprises a percent contact area of the second surface from about 0.1% to at least about 50% or more, from about 0.5% to at least about 40% or more, from about 1% to at least about 30% or more, from about 2% to at least about 20% or more, or from about 5% to at least about 10% or more.

40. A method of joining two or more articles, the method comprising:

i) providing a first article having at least a first surface;

ii) providing at least a second article having at least a first surface; and,

iii) providing a layer of nanofibers disposed between the first surface of the first article and the first surface of the at least second article, whereby the nanofibers contact the first surface of the first article at a plurality of contact points and the first surface of the at least second article at a plurality of contact points, such that forces between the nanofibers and the first surface of the first article and the first surface of the at least second article adhere the articles together.

41. The method of claim 40, wherein the forces between the nanofibers and the first surface of the second article and between the nanofibers and the first surface of the first article, comprise van der Waals forces.

42. The method of claim 40, wherein the forces between the nanofibers and the first surface of the second article and between the nanofibers and the first surface of the first article, comprise friction forces.

43. An adhesive device, the device comprising:

i) a first article having at least a first surface;

ii) at least a second article having at least a first surface; and,

iii) a layer of nanofibers disposed between the first surface of the first article and the first surface of the at least second article, whereby the nanofibers contact the first surface of the first article at a plurality of contact points and the first surface of the at least second article at a plurality of contact points, such that forces between the nanofibers and the first surface of the first article and the first surface of the at least second article adhere the articles together.

44. The device of claim 43, wherein one or more of the first surface and the at least second surface comprises a plurality of nanofibers.

45. The device of claim 43, wherein physical contact between the first and at least second substrate produces a van der Waals attraction between the surfaces.

46. The method of claim 43, wherein contacting the first surface and the at least second surface creates adherence between the surfaces through creation of friction forces between the surfaces.

47. The device of claim 45, wherein the attraction comprises from at least about 0.1 newton per centimeter^2 to at least about 100 newtons per centimeter^2.

48. The device of claim 45, wherein the attraction comprises from at least about 0.5 newton per centimeter^2 to at least about 50 newtons per centimeter^2.

49. The device of claim 45, wherein the attraction comprises from at least about 1 newton per centimeter^2 to at least about 25 newtons per centimeter^2.

50. The device of claim 45, wherein the attraction comprises from at least about 2 newtons per centimeter^2 to at least about 10 newtons per centimeter^2.

51. The device of claim 43, wherein the nanofibers comprise hollow nanotubular structures.

52. The device of claim 43, wherein substantially all nanofibers comprise one or more associated moiety.

53. The device of claim 52, wherein the one or more moiety comprises a functional moiety.

54. The device of claim 53, wherein the functional moiety increases a van der Waals attraction between the nanofiber and one or more of the first surface or the at least second surface, to be greater than a van der Waals attraction between the nanofiber and such surface in the absence of the moiety.

55. The method of claim 53, wherein the functional moiety increases friction forces between the nanofiber and one or more of the first surface or the at least second surface to be greater than a friction force between the nanofiber and such surface in the absence of the moiety.

56. The device of claim 43, wherein substantially each member of the plurality of nanofibers passes more than once though a selected plane above the first surface.